

REMARKS

Claims 1-25 are all the claims pending in the application. The drawings and specification are objected to and claims 1-17, 20-21, and 23-25 are rejected on prior art grounds. Claims 18-19 and 22 are allowed. Applicants herein amend claims 1, 4, 10, 13, 14, 16, 20, 21, and 23-25. Applicants respectfully traverse the objections/rejections based on the following discussion.

I. The Objections to the Drawings

The drawings stand objected to because, according to the Office Action, the drawings do not show “first and second pixel electrodes having different electrical characteristics from one another.” However, Figures 9 illustrates pixel electrodes A21 and B21, which have different electrical characteristics from one another. In fact, paragraphs [0112] to [0116] of the specification, as originally filed, describe Figure 9 in more detail. Specifically, paragraph [0116] recites:

Another effect is that uniformity of the liquid crystal display panel is enhanced. Since the pixel electrodes A21 and B21 have the different pixel structures, the pixel electrodes A21 and B21 have different electrical characteristics. According to the arrangement of the pixel electrodes A1, B1,... of the first embodiment, the pixel columns having the different electrical characteristics are arranged alternately. Accordingly, in an image displayed on such a liquid crystal display panel, difference in electrical characteristics become conspicuous. However, in the case where the pixels having the different electrical characteristics are arranged in a checked pattern as the third embodiment, the difference in electrical characteristics is inconspicuous in the displayed image.

Clearly, when the drawings are interpreted in light of the description provided in the specification, the drawings do indeed show every feature of the invention specified in the claims. In view of the foregoing, the Examiner is respectfully requested to reconsider and withdraw the

objections to the drawings.

II. The Objection to the Specification

The specification stands objected to as failing to provide proper antecedent basis for the claimed subject matter with regard to the claimed “first and second pixel electrodes having different electrical characteristics from one another.” However, Figures 9 clearly illustrates pixel electrodes A21 and B21, which have different electrical characteristics from one another. However, paragraphs [0112] to [0116] of the specification, as originally filed, describe these claimed features in more detail. Specifically, paragraph [0116] recites:

Another effect is that uniformity of the liquid crystal display panel is enhanced. Since the pixel electrodes A21 and B21 have the different pixel structures, the pixel electrodes A21 and B21 have different electrical characteristics. According to the arrangement of the pixel electrodes A1, B1,... of the first embodiment, the pixel columns having the different electrical characteristics are arranged alternately. Accordingly, in an image displayed on such a liquid crystal display panel, difference in electrical characteristics become conspicuous. However, in the case where the pixels having the different electrical characteristics are arranged in a checked pattern as the third embodiment, the difference in electrical characteristics is inconspicuous in the displayed image.

Clearly, the originally filed specification does indeed provide proper antecedent basis for the claimed subject matter. In view of the foregoing, the Examiner is respectfully requested to reconsider and withdraw the objection to the specification.

III. The Rejections to the Claims

A. The 35 U.S.C. §112 Rejections

Claim 4 stands rejected under 35 U.S.C. §112, second paragraph, as being indefinite for

failing to particularly point out and distinctly claim the subject matter which the applicant regards as the invention. Specifically, the Office Action questions which electrical characteristics are different and why they are different. When the claims are properly read in light of the specification, and in particular, paragraphs [0115] and [0116] of the specification, it is clear that the claimed subject matter is definite, and that because the first and second pixel electrodes (A21 and B21 respectively) have different pixel structures, the first and second pixel electrodes have different electrical characteristics. Specifically, the first pixel electrode includes two thin film transistors while the second pixel electrode has only one thin film transistor formed thereon. As paragraphs [0115] and [0116] recite:

One effect is that it is possible to design an image display device which minimizes an occupied area other than the aperture portion of the pixel. Herein, when the pixel in which the pixel electrode A21 exists and the pixel in which the pixel electrode B21 exists are compared, it is shown that the former pixel has a crowded structure compared to the latter pixel since the former pixel has the two TFTs of the first and second TFTs M21 and M22 formed thereon and the latter pixel has only one TFT M23 formed thereon. This crowded pixel causes an increase in an area of each pixel. In the first embodiment, the crowded pixels are continuously arranged in the same column, the area of the pixel tends to be larger. However, if the crowded pixel and the uncrowded pixel are sequentially arranged in the column direction like the third embodiment, the increase in the area of the crowded pixel can be canceled by the uncrowded pixel. Specifically, the occupied area other than the aperture portion of the pixel can be minimized.

Another effect is that uniformity of the liquid crystal display panel is enhanced. Since the pixel electrodes A21 and B21 have the different pixel structures, the pixel electrodes A21 and B21 have different electrical characteristics. According to the arrangement of the pixel electrodes A1, B1,... of the first embodiment, the pixel columns having the different electrical characteristics are arranged alternately. Accordingly, in an image displayed on such a liquid crystal display panel, difference in electrical characteristics become conspicuous. However, in the case where the pixels having the different electrical characteristics are arranged in a

checked pattern as the third embodiment, the difference in electrical characteristics is inconspicuous in the displayed image.

Thus, the differences in the electrical characteristics are not merely related to the different physical locations of the first and second pixel electrodes, but rather the formation and the actual physical structure of the first and second pixel electrodes thereby resulting in differences in the electrical characteristics of each other. In view of the foregoing, the Examiner is respectfully requested to reconsider and withdraw the rejection to claim 4.

B. The Prior Art Rejections

Claims 1-3 and 14-15 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Kwon (U.S. Patent No. 6,486,930) in view of Libsch, et al. (U.S. Patent No. 6,476,787 B1), hereinafter referred to as Libsch. Claim 4 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Yamahara, et al., et al. (U.S. Patent No. 5,579,140), hereinafter referred to as Yamahara. Claims 5-9 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Kwon, in view of Libsch, and in further view of Yamahara. Claim 20 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Fujiyoshi, et al. (U.S. Patent No. 6,323,871 B1), hereinafter referred to as Fujiyoshi, in view of Kwon. Claims 10-13, 16-17, 21 and 23-25 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Kwon in view of Libsch. Applicants respectfully traverse these rejections based on the following discussion.

Kwon teaches a liquid crystal display and a circuit for driving the same, having a higher resolution and being able to be manufactured at low cost. The liquid crystal display having first and second plates and a liquid crystal being sealed therebetween includes: a plurality of scanning lines arranged on the first plate one direction; a plurality of data lines arranged on the first plate,

intersecting the scanning lines; first and second pixel regions, located at both sides of each data line, respectively; a first switch for selectively transmitting a video signal loaded on a corresponding data line to the first pixel region; and a second switch for selectively transmitting the video signal loaded on the data line to the second pixel region.

Libsch teaches an active matrix display including a plurality of pixels arranged in an array. At least two transistors are included for coupling to each pixel, and the transistors are positioned within the array for switching the pixels on and off according to data and gate signals. A plurality of control lines are coupled to the transistors of each pixel such that the control lines provide multiplexing for at least one of data signal multiplexing and gate signal multiplexing.

Yamahara teaches a liquid crystal display element which includes two opposing electrodes, and a liquid crystal layer disposed between said electrodes, wherein an alignment film for aligning a liquid crystal of said liquid crystal layer in at least three different directions is disposed above a side of said liquid crystal layer of at least one of said electrodes is disclosed.

Fujiyoshi teaches a matrix-addressed liquid crystal display device, and its driving method in which pixels to display one color by combining a plurality of basic colors are arranged, the power consumption in a drive circuit system is reduced, and no degradation of the image quality is generated, is characterized by comprising a signal input means N, wherein a large number of pixels are matrix-addressed by a large number of scanning lines G and a large number of signal lines S, combination of a plurality of basic colors are repeatedly arranged along the direction of each signal line, the number of the scanning lines is the number of all pixels arranged along the signal lines, the order of the basic colors arranged along the signal lines is repeatedly the same number along the signal lines, the same basic colors are arranged along the scanning lines, and the signal to be transmitted to each signal line for each scanning line is successively transmitted

to a source driver from the source driver Sd.

However, the amended claimed invention teaches away from the prior art of record. Specifically, amended independent claims 1, 4, 10, 13, 14, 16, 20, 21, and 23-25 generally recite, in part, “the first pixel electrode comprises two thin film transistors and the second pixel electrode comprises only one thin film transistor,” which none of the cited prior art references teach. First, Kwon, Yamahara, and Fujiyoshi say nothing regarding the structural characteristics of its respective electrodes. Second, Libsch indicates that each of its pixels comprises at least two transistors (see column 3, lines 57-60). Conversely, the claimed invention’s first pixel comprises two thin film transistors while the second pixel comprises only one thin film transistor, thereby distinguishing the claimed invention from each of the cited prior art references.

Additionally, page 7 of the Office Action states that “Yamahara et al. teaches first and second pixel electrodes having different electrical characteristics from one another (See Col. 2, Lines 55-63).” However, a careful reading of Yamahara clearly indicates that this is not quite the teaching of Yamahara. Column 2, lines 55-63 of Yamahara does not teach two pixel electrodes at all, but rather one pixel electrode split into two portions “so as to have different independent viewing angle characteristics.” In this regard, Yamahara is different from the claimed invention. First, the one electrode split into two portions of Yamahara does not patentably equate to the two separate pixel electrodes of the claimed invention. Second, the “viewing angle characteristics” of Yamahara does not patentably equate to the electrical characteristics of the claimed invention. Third, as indicated above, there is no teaching in Yamahara of a first pixel electrode comprising two thin film transistors and the second pixel electrode comprising only one thin film transistor, as provided by the claimed invention, thereby

distinguishing the claimed invention from Yamahara, even if combined with Kwon.

Moreover, with regard to the rejections based on Kwon, in the claimed invention, each pixel TFT (M1, M3, etc.) connected to each pixel is connected directly to the signal line.

Accordingly, unlike Kwon, it is unnecessary to design the TFT of the claimed invention to be large-sized. With this configuration, an aperture ratio of the pixels can be increased. This is a significant advantage from the viewpoint of extendibility to higher resolution displays and of quality of displays.

Furthermore, as to the claimed invention, one of the scanning lines adjacent to the pixel is not associated with the addressing of the pixel. Accordingly, unlike Kwon, a storage capacitor can be arranged in the claimed invention between the pixel electrode and one of the scanning lines adjacent to the pixel. The claimed invention's storage capacitor is advantageous for liquid crystal display products. However, Kwon does not mention anything regarding the storage capacitor, and regarding an advantage of addressing by two scan lines disposed at one side of the pixel. As previously mentioned, the configuration provided by the claimed invention results in an increase in the aperture ratio of the pixels.

As to claimed invention, different pixels are arranged in a row and column alternately as provided in claim 4, whereas Kwon does not teach or suggest this arrangement. Furthermore, in the claimed invention, a longer gate pulse turns on again before changing signal line voltage (as demonstrated in Figures 19 and 26, and the accompanying descriptions thereof in the present application). Again, these are features absent from Kwon.

Additionally, claim 4 teaches away from Kwon by including the elements, "first and second pixel electrodes having different electrical characteristics from one another, wherein said first and second pixel electrodes are arranged in a checked pattern so as to interpose said signal

line therebetween;...” The advantages of the arrangement provided by claim 4 and as described in the application are (1) increasing aperture ratio of pixels, and (2) enhancement of an image quality. These are features absent in Kwon.

As to claim 7, Kwon does not show the configuration described in the claimed invention. Specifically, in Kwon, the first switching element connected to the signal line is not directly connected to the first pixel electrode in contrast to the conclusion reached in the Office Action. With the direct connection provided in the claimed invention, it is unnecessary to design the TFT to be large-sized in contrast to Kwon. Again, this is a significant advantage from the viewpoint of extendibility to higher resolution displays and of quality of displays.

As to claim 9, Kwon does not show the configuration described in the claimed invention. Specifically, Kwon does not teach an image display device comprising a first switching element connected to a signal line; a second switching element connected to the first switching element; a third switching element connected to a signal line; a first scanning line for supplying a scanning signal to the second and third switching elements; a second scanning line for supplying a scanning signal to the first and fourth switching element; and a fourth switching element connected to the third switching element. In fact, Kwon does not operate in the above-described configuration provided by the claimed invention. Moreover, a driving waveform for the above configuration provided by the claimed invention is also different from those provided in the other prior art of record. As shown in Figure 26 of the present application, a longer gate pulse turns on again before changing a signal line voltage. This is different from the prior art.

With respect to claim 10, one of the scanning lines adjacent to the pixel is not associated with the addressing of the pixel. Accordingly, unlike Kwon, a storage capacitor can be arranged between the pixel electrode and one of the scanning lines adjacent to the pixel. Again, with this

configuration, an aperture ratio of the pixels can be increased. Moreover, as previously mentioned, the storage capacitor is an advantageous aspect of the claimed invention. However, Kwon does not teach or suggest incorporating a storage capacitor, and does not teach addressing two scanning lines disposed at one side of the pixel.

Additionally, claims 12, 13, 16, and 25 contain features not taught or suggested in Kwon. Specifically, claim 12 depends on claim 11, and as such contains all the limitations provided therein, and claims 13, 16, and 25 include a storage capacitor, which is not taught or suggested in Kwon. Moreover, it would be unobvious to include a storage capacitor in Kwon because there is no suggestion in Kwon that such a feature would provide advantageous results therein.

With regard to claim 1, in the claimed invention, there is a first switching element having a gate electrode for controlling the supply of display signals and a second switching element disposed between the gate electrode of the first switching element and specified one of scanning lines. However, Kwon does not teach or suggest the above configuration. In fact, the configuration provided by the claimed invention enables the single source-to-drain connection (i.e., direct connection) such that each pixel TFT (M1, M3, etc.) connected to each pixel is connected directly to the signal line. Accordingly, unlike Kwon, it is unnecessary to design the TFT of the claimed invention to be large-sized. Again, with this configuration provided by the claimed invention, an aperture ratio of the pixels can be increased. As mentioned, this is a significant advantage from the viewpoint of extendibility to higher resolution displays and of quality of displays.

Insofar as references may be combined to teach a particular invention, and the proposed combination of Kwon with Libsch, Kwon with Yamahara, Kwon with Yamahara and with Libsch, and Fujiyoshi and Kwon case law establishes that, before any prior-art references may be

validly combined for use in a prior-art 35 U.S.C. § 103(a) rejection, the individual references themselves or corresponding prior art must suggest that they be combined.

For example, in In re Sernaker, 217 U.S.P.Q. 1, 6 (C.A.F.C. 1983), the court stated: “[P]rior art references in combination do not make an invention obvious unless something in the prior art references would suggest the advantage to be derived from combining their teachings.” Furthermore, the court in Uniroyal, Inc. v. Rudkin-Wiley Corp., 5 U.S.P.Q.2d 1434 (C.A.F.C. 1988), stated, “[w]here prior-art references require selective combination by the court to render obvious a subsequent invention, there must be some reason for the combination other than the hindsight gleaned from the invention itself. . . . Something in the prior art must suggest the desirability and thus the obviousness of making the combination.”

In the present application, the reason given to support the proposed combination is improper, and is not sufficient to selectively and gratuitously substitute parts of one reference for a part of another reference in order to try to meet, but failing nonetheless, the Applicant’s novel claimed invention. Furthermore, the claimed invention, as amended, meets the above-cited tests for obviousness by including embodiments such as having a first pixel electrode comprising two thin film transistors and a second pixel electrode comprising only one thin film transistor, among others. As such, all of the claims of this application are, therefore, clearly in condition for allowance, and it is respectfully requested that the Examiner pass these claims to allowance and issue.

As declared by the Federal Circuit:

In proceedings before the U.S. Patent and Trademark Office, the Examiner bears the burden of establishing a prima facie case of obviousness based upon the prior art. The Examiner can satisfy this burden only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references. In re Fritch, 23 U.S.P.Q.2d 1780, 1783 (Fed. Cir. 1992) citing In re

Fine, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988).

Here, the Examiner has not met the burden of establishing a prima facie case of obviousness. It is clear that, not only does Kwon individually fail to disclose all of the elements of the claims of the present invention, particularly, having a first pixel electrode comprising two thin film transistors and a second pixel electrode comprising only one thin film transistor as discussed above, but also, if combined with Libsch, Yamahara, and Fujiyoshi, respectively, fails to disclose these elements as well. The unique elements of the claimed invention are clearly an advance over the prior art.

The Federal Circuit also went on to state:

The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification. . . . Here the Examiner relied upon hindsight to arrive at the determination of obviousness. It is impermissible to use the claimed invention as an instruction manual or "template" to piece together the teachings of the prior art so that the claimed invention is rendered obvious. This court has previously stated that one cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention. Fritch at 1784-85, citing In re Gordon, 221 U.S.P.Q. 1125, 1127 (Fed. Cir. 1984).

Here, there is no suggestion that Kwon, alone or in combination with Libsch, Yamahara, and Fujiyoshi teaches a method and apparatus containing all of the limitations of the claimed invention. Consequently, there is absent the "suggestion" or "objective teaching" that would have to be made before there could be established the legally requisite "prima facie case of obviousness."

Additionally, the claimed invention has already been implemented into commercially successful products. Thus, the novel configuration of the Applicants' claimed invention is a clear distinction from the prior art of record, and as such in view of the foregoing, the Examiner

is respectfully requested to reconsider and withdraw these rejections.

IV. Formal Matters and Conclusion

With respect to the rejections to the claims, the claims have been amended, above, to overcome these rejections. Moreover, the Applicants respectfully submit that independent claims 1, 4, 10, 13-14, 16, 18, and 20-25 are patentable over the prior art of record. Furthermore, dependent claims 2-3, 5-9, 11-12, 15, 17, and 19 are similarly patentable, not only by virtue of their dependency from a patentable independent claim, but also by virtue of the additional features of the invention they define.

In view of the foregoing, the Examiner is respectfully requested to reconsider and withdraw the rejections to the claims. Applicants submit that claims 1-25, all the claims presently pending in the application, are patentably distinct from the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary. Please charge any deficiencies and credit any overpayments to Attorney's Deposit Account Number 50-0510.

Respectfully submitted,

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